LITEON®
OPTOELECTRONICS

# Photocoupler
# Product Data Sheet
## 4N25/ 4N26
## (M, S, S-TA1)

**Spec No. :DS-70-99-0010**
**Effective Date: 05/04/2022**
**Revision: F**

**LITE-ON DCC**

**RELEASE**

**BNS-OD-FC001/A4**

**LITE-ON Technology Corp. / Optoelectronics**
No.90,Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C.
Tel: 886-2-2222-6181 Fax: 886-2-2221-1948 / 886-2-2221-0660
http://www.liteon.com/opto

# Photocoupler
# 4N2X Series

## 1. DESCRIPTION

### 1.1 Features

- High Current transfer ratio (CTR : MIN. 10% at IF = 10mA, VCE = 10V )
- Response time( ton : TYP. 3μs at VCC = 10V, IC = 2mA, RL = 100Ω )
- Input-output isolation voltage
  4N25 series : Viso = 2,500Vrms
  4N26 series : Viso = 1,500Vrms
  4N27 series : Viso = 1,500Vrms
  4N28 series : Viso = 500Vrms
- Dual-in-line package :

  4N25, 4N26, 4N27, 4N28
- Wide lead spacing package :

  4N25M, 4N26M, 4N27M, 4N28M
- Surface mounting package :

  4N25S, 4N26S, 4N27S, 4N28S
- Tape and reel packaging :

  4N25S-TA1, 4N26S-TA1, 4N27S-TA1, 4N28S-TA1
- Safety approval

  * UL approved

  * cUL approved

  * CSA approved

  * DEMKO approved

  * VDE approved

  * CQC approved
- RoHS Compliance

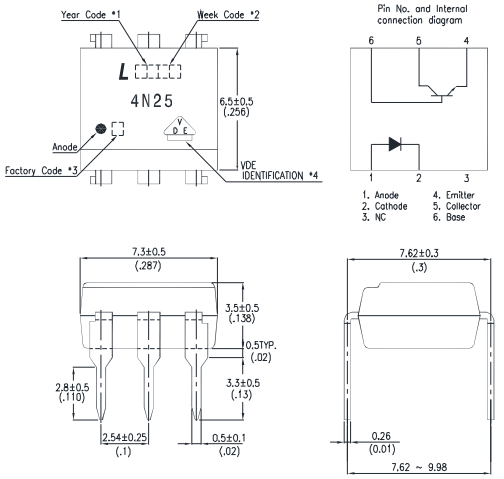
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC, 2011/65/EU, and 2015/863).
- MSL class 1

### 1.2 Applications

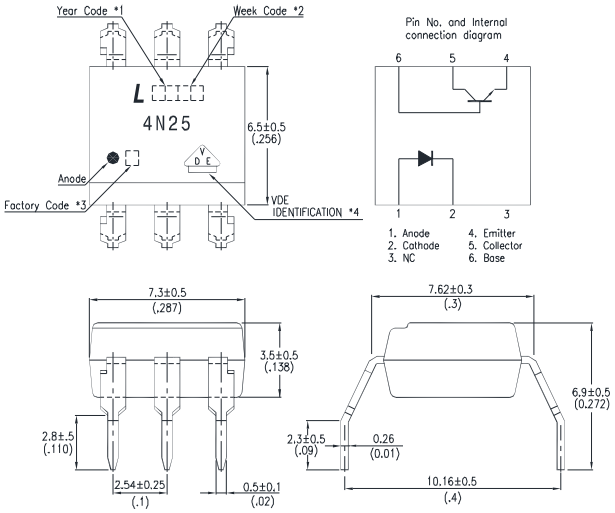
- Hybrid substrates that require high density mounting.
- Programmable controllers

# 2. PACKAGE DIMENSIONS

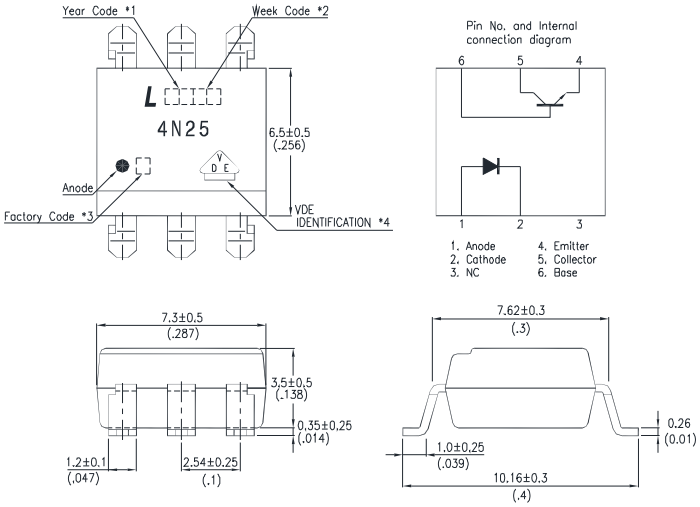
## 2.1 4N25




## 2.2 4N25M




## 2.3 4N25S

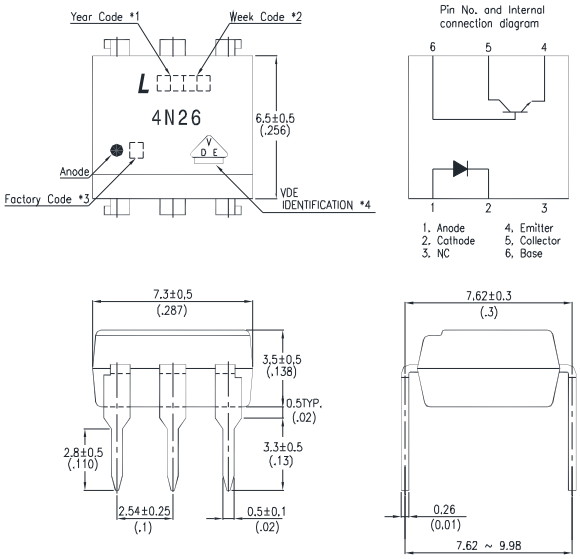



**Notes :**

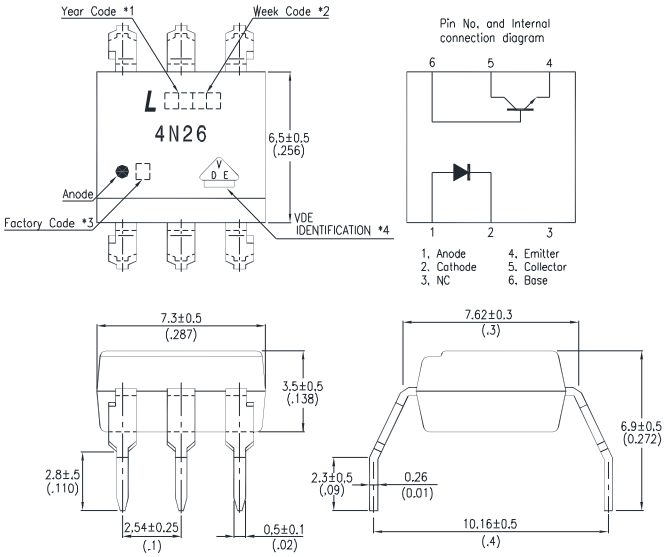
1. 2-digit year code, example : 2016 = 16
2. 2-digit work week ranging from ‘01’ to ‘53’
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option.

Dimensions in millimeters (inches).

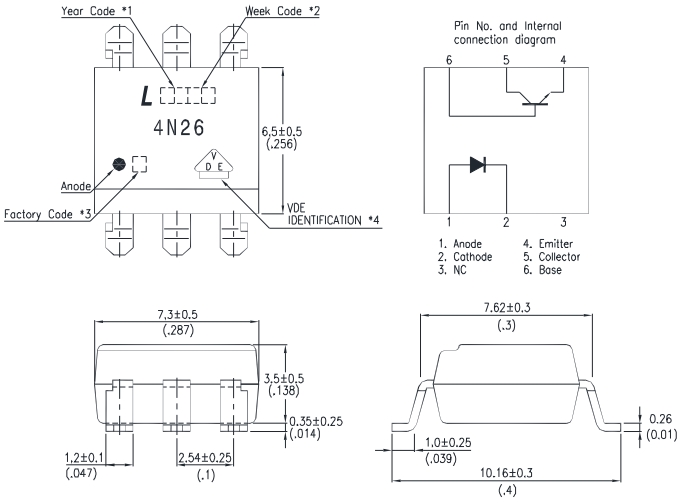
## 2.4 4N26




## 2.5 4N26M




## 2.6 4N26S




**Notes :**

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2. 2-digit work week ranging from ‘01’ to ‘53’
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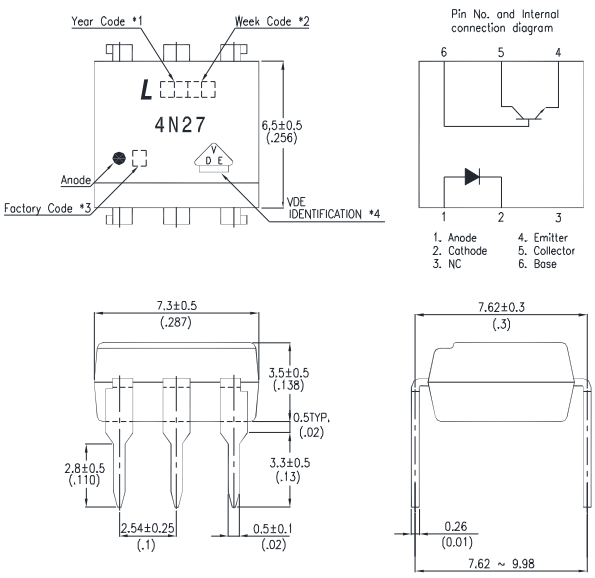
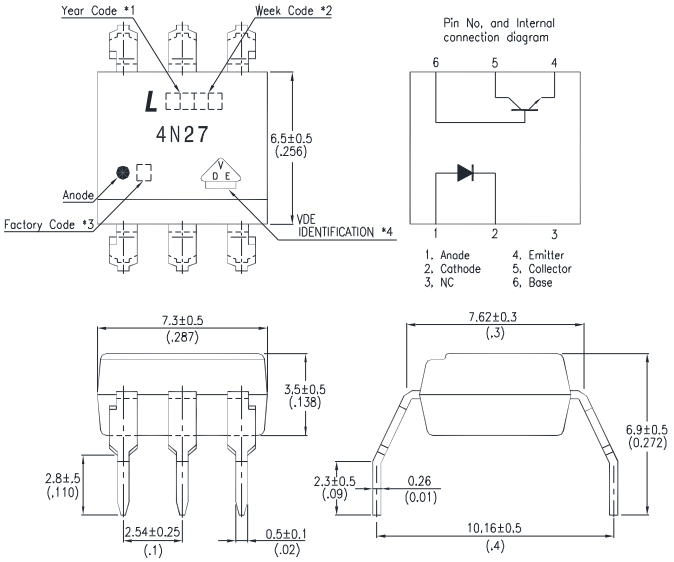
4. VDE option.

Dimensions in millimeters(inches).

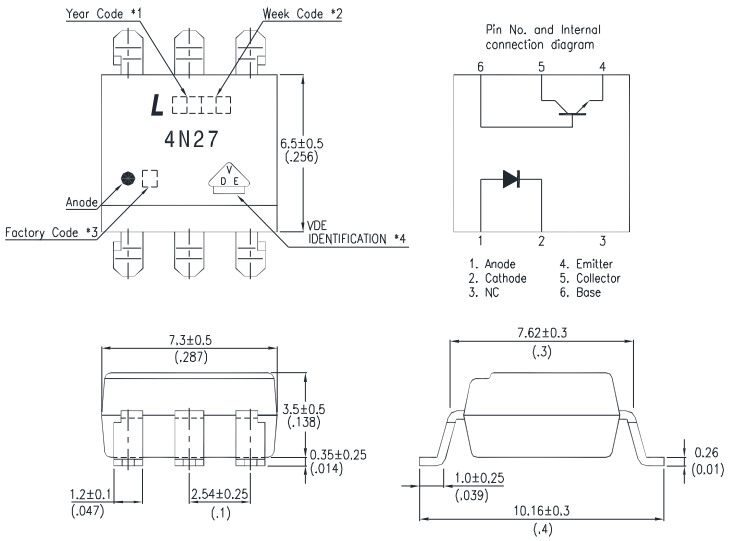
## 2.7 4N27




## 2.8 4N27M




## 2.9 4N27S

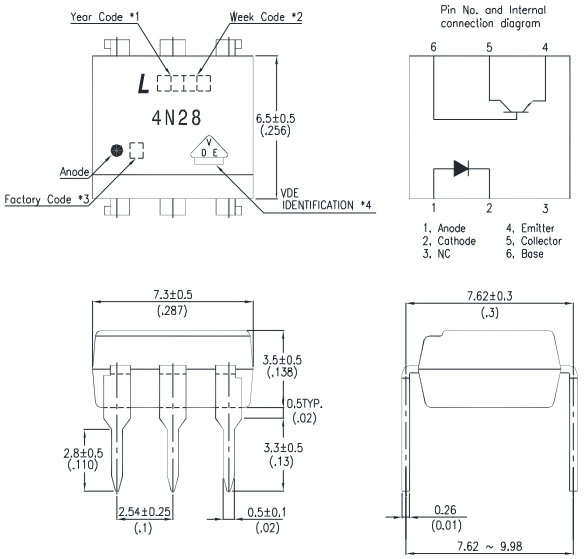



**Notes :**

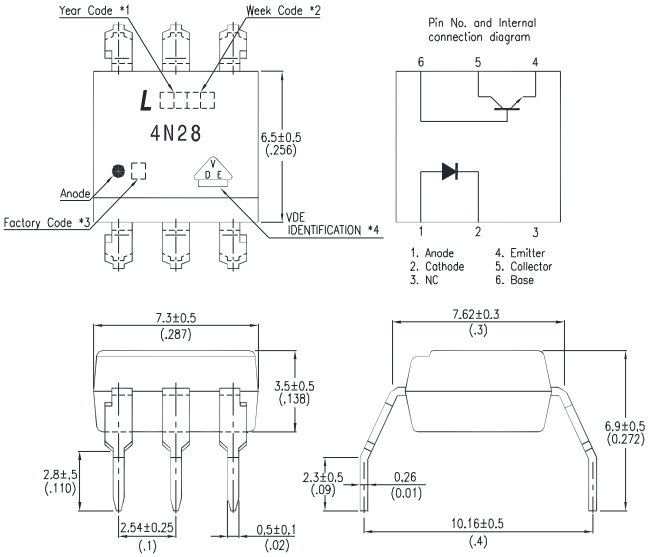
1. 2-digit year code, example : 2016 = 16
2. 2-digit work week ranging from ‘01’ to ‘53’
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option.

Dimensions in millimeters(inches).

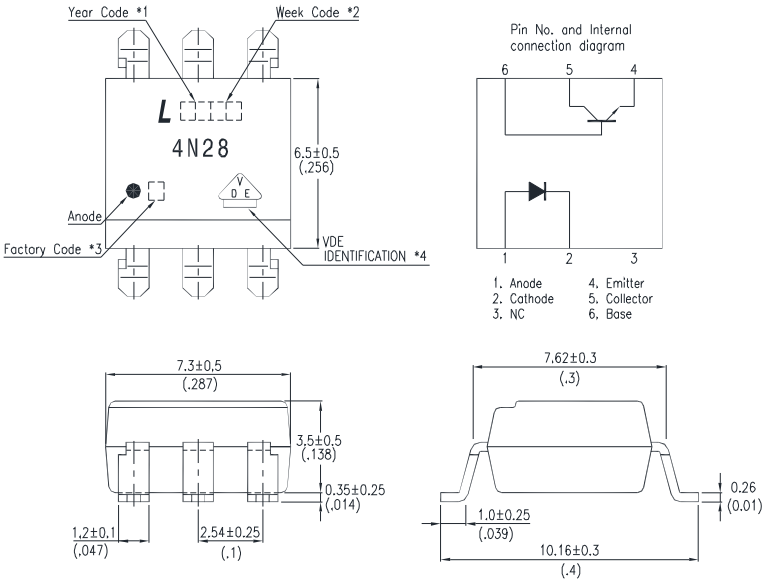
## 2.10 4N28




## 2.11 4N28M




## 2.12 4N28S



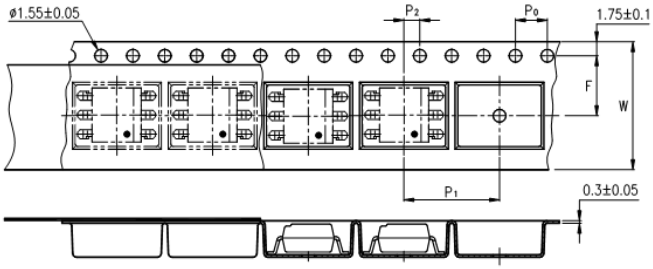

**Notes :**

1. 2-digit year code, example : 2016 = 16
2. 2-digit work week ranging from ‘01’ to ‘53’
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option.

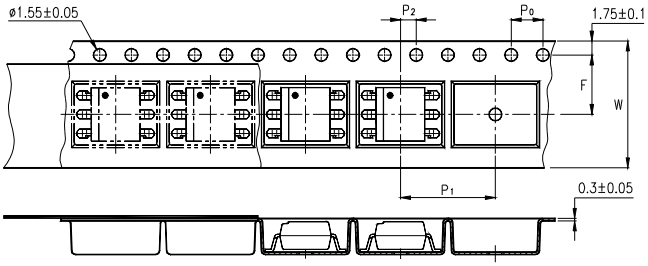
Dimensions in millimeters(inches).

## 3. TAPING DIMENSIONS

### 3.1 4N25S-TA , 4N26S-TA , 4N27S-TA , 4N28S-TA




### 3.2 4N25S-TA1 , 4N26S-TA1 , 4N27S-TA1 , 4N28S-TA1




| Description | Symbol | Dimension in mm (inch) |
|---|---|---|
| Tape wide | W | 16±0.3 (0.63) |
| Pitch of sprocket holes | $P_0$ | 4±0.1 (0.15) |
| Distance of compartment | F | 7.5±0.1 (0.295) |
| | $P_2$ | 2±0.1 (0.079) |
| Distance of compartment to compartment | $P_1$ | 12±0.1 (0.472) |

### 3.3 Quantities Per Reel

| Package Type | TA/TA1 |
|---|---|
| Quantities (pcs) | 1000 |

# 4. RATING AND CHARACTERISTICS

## 4.1 Absolute Maximum Ratings at Ta=25℃

| | Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|---|
| Input | Forward Current | | $I_F$ | 80 | mA |
| | Reverse Voltage | | $V_R$ | 6 | V |
| | Power Dissipation | | P | 150 | mW |
| Output | Collector - Emitter Voltage | | $V_{CEO}$ | 30 | V |
| | Emitter - Collector Voltage | | $V_{ECO}$ | 7 | V |
| | Collector - Base Voltage | | $V_{CBO}$ | 70 | V |
| | Collector Current | | $I_C$ | 100 | mA |
| | Collector Power Dissipation | | $P_C$ | 150 | mW |
| Total Power Dissipation | | | $P_{tot}$ | 250 | mW |
| *1 Isolation Voltage | | 4N25 series | $V_{iso}$ | 2,500 | $V_{rms}$ |
| | | 4N26 series | | 1,500 | |
| | | 4N27 series | | 1,500 | |
| | | 4N28 series | | 500 | |
| Operating Temperature | | | $T_{opr}$ | -55 ~ +100 | °C |
| Storage Temperature | | | $T_{stg}$ | -55 ~ +150 | °C |
| *2 Soldering Temperature | | | $T_{sol}$ | 260 | °C |

*1. AC For 1 Minute, R.H. = 40 ~ 60%

Isolation voltage shall be measured using the following method.

(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.

(2) The isolation voltage tester with zero-cross circuit shall be used.

(3) The waveform of applied voltage shall be a sine wave.

*2. For 10 Seconds

### 4.2 Electrical Optical Characteristics at Ta=25℃

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Input | Forward Voltage | $V_F$ | — | 1.2 | 1.5 | V | $I_F$=10mA |
| | Reverse Current | $I_R$ | — | — | 10 | μA | $V_R$=4V |
| | Terminal Capacitance | $C_t$ | — | 50 | — | pF | V=0, f=1KHz |
| Output | Collector Dark Current | $I_{CEO}$ | — | — | 50 | nA | $V_{CE}$=10V, $I_F$=0 |
| | Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 30 | — | — | V | $I_C$=0.1mA, $I_F$=0 |
| | Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | 7 | — | — | V | $I_E$=10μA, $I_F$=0 |
| | Collector-Base Breakdown Voltage | $BV_{CBO}$ | 70 | — | — | V | $I_C$=0.1mA, $I_F$=0 |
| TRANSFER CHARACTERISTICS | Collector Current (4N25/4N26) | $I_C$ | 2 | — | — | mA | $I_F$=10mA, $V_{CE}$=10V |
| | * Current Transfer Ratio (4N25/4N26) | CTR | 20 | — | — | % | |
| | Collector Current (4N27/4N28) | $I_C$ | 1 | — | — | mA | |
| | * Current Transfer Ratio (4N27/4N28) | CTR | 10 | — | — | % | |
| | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | 0.1 | 0.5 | V | $I_F$=50mA, $I_C$=2mA |
| | Isolation Resistance | $R_{iso}$ | $5\times10^{10}$ | $1\times10^{11}$ | — | Ω | DC500V, 40 ~ 60% R.H. |
| | Floating Capacitance | $C_f$ | — | 1 | — | pF | V=0, f=1MHz |
| | Response Time (Rise) | $t_r$ | — | 3 | — | μs | $V_{CE}$=2V, $I_C$=2mA $R_L$=100Ω, |
| | Response Time (Fall) | $t_f$ | — | 3 | — | μs | |

*. Current Transfer Ratio $CTR = \frac{I_C}{I_F} \times 100\%$

## 5. CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

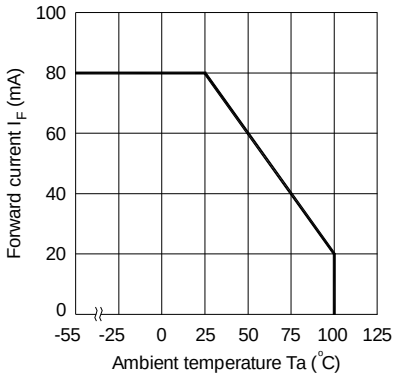



Fig.2 Collector Power Dissipation vs. Ambient Temperature

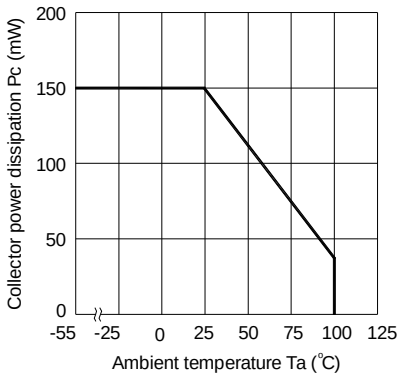



Fig.3 Forward Current vs. Forward Voltage

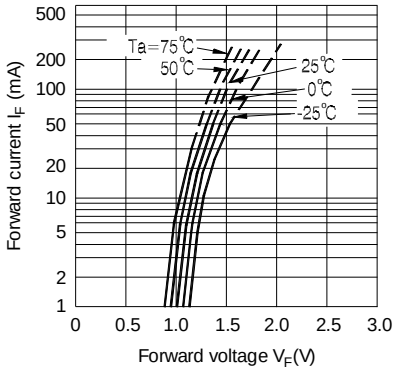



Fig.4 Current Transfer Ratio vs. Forward Current

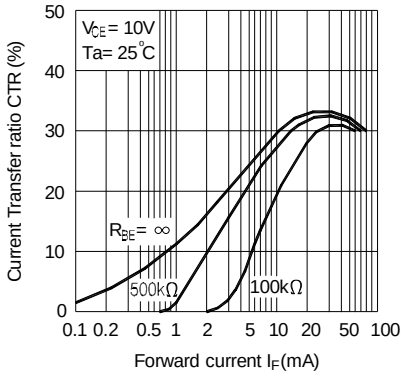



Fig.5 Collector Current vs. Collector-emitter Voltage

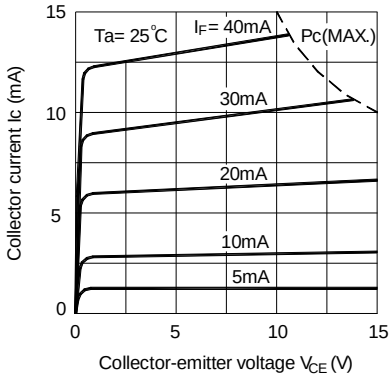



Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature

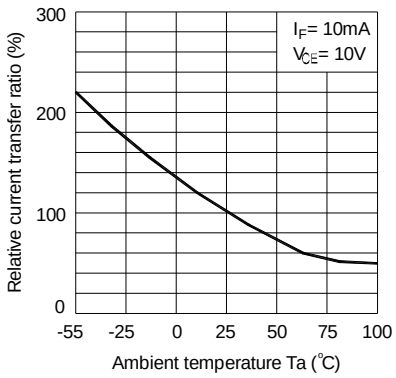


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

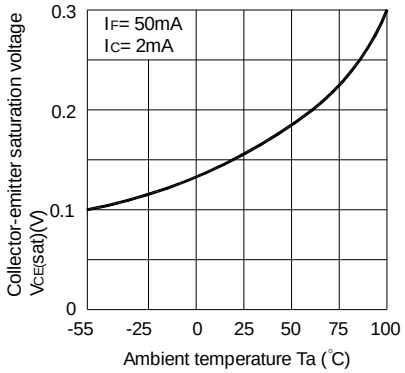



Fig.8 Collector Dark Current vs. Ambient Temperature

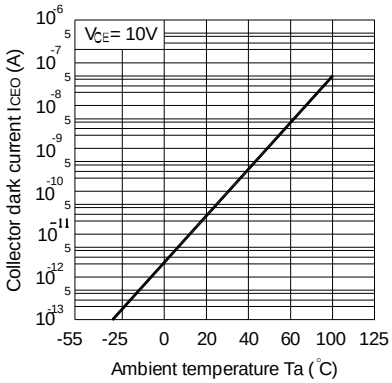



Fig.9 Response Time vs. Load Resistance

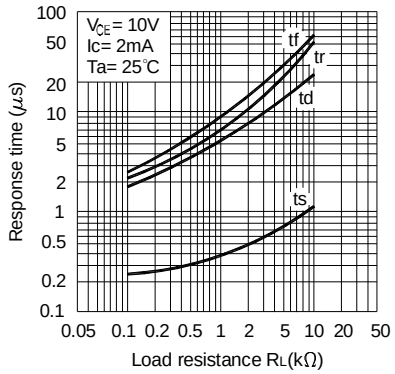



Fig.10 Frequency Response

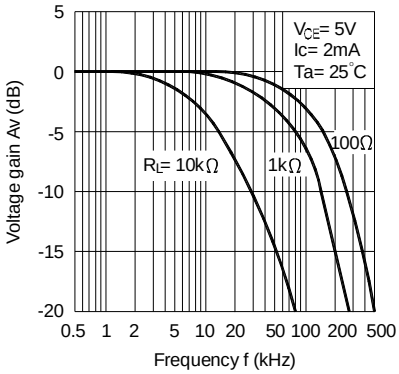
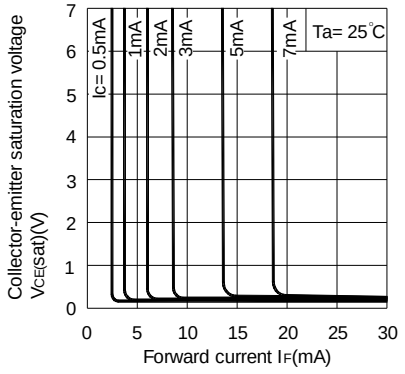
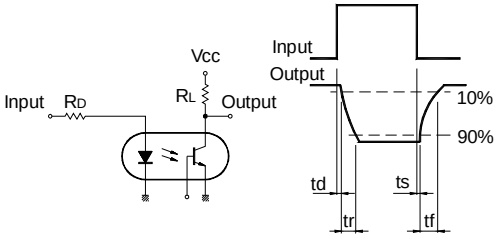


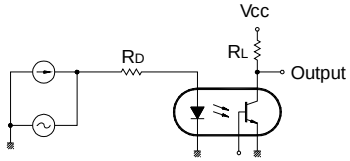

Fig.11 Collector-emitter Saturation Voltage vs. Forward Current




Test Circuit for Response Time




Test Circuit for Frequency Response

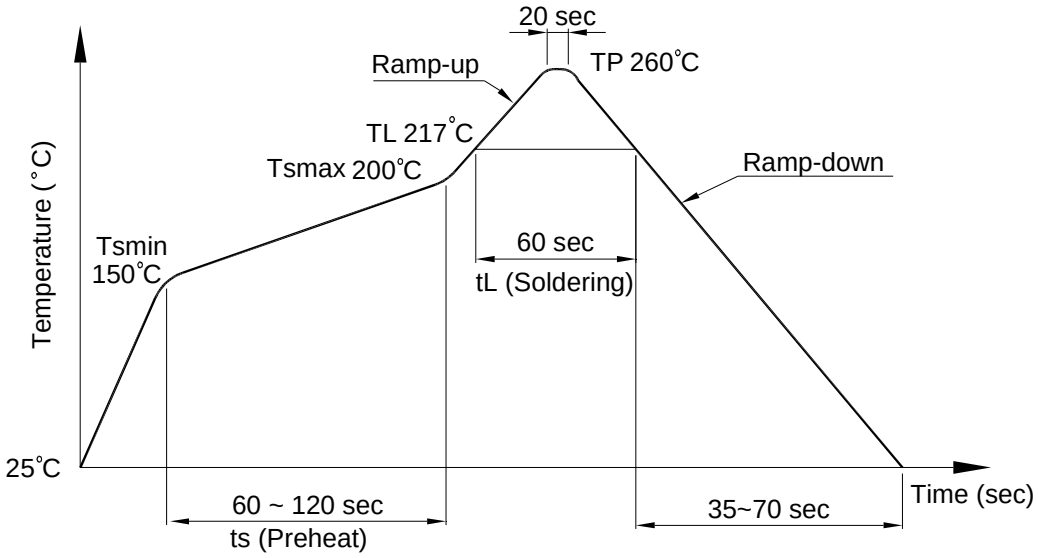


# 6. TEMPERATURE PROFILE OF SOLDERING

## 6.1 IR Reflow Soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

| Profile item | Conditions |
|---|---|
| Preheat | |
| - Temperature Min ($T_{Smin}$) | 150˚C |
| - Temperature Max ($T_{Smax}$) | 200˚C |
| - Time (min to max) (ts) | 90±30 sec |
| Soldering zone | |
| - Temperature ($T_L$) | 217˚C |
| - Time ($t_L$) | 60 sec |
| Peak Temperature ($T_P$) | 260˚C |
| Ramp-up rate | 3˚C / sec max. |
| Ramp-down rate | 3~6˚C / sec |



## 6.2 Wave Soldering (JEDEC22A111 compliant)

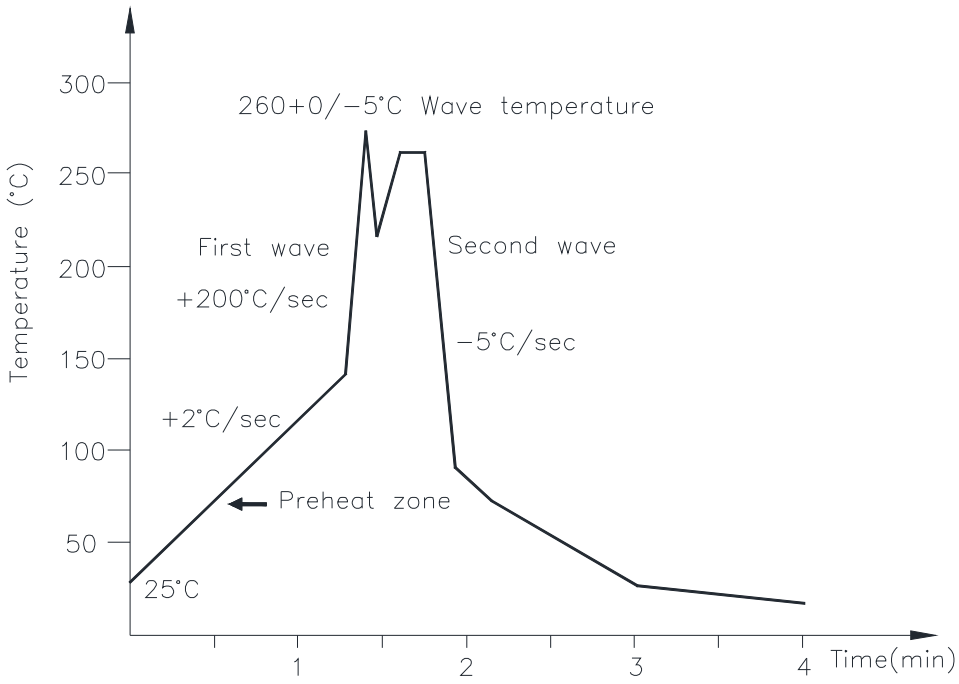
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5˚C

Time: 10 sec.

Preheat temperature:25 to 140˚C

Preheat time: 30 to 80 sec.



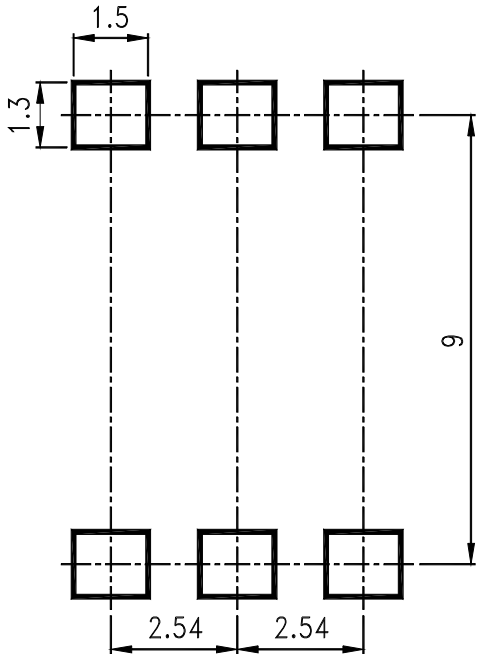

## 6.3 Hand Soldering by Soldering Iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

Time: 3 sec max.

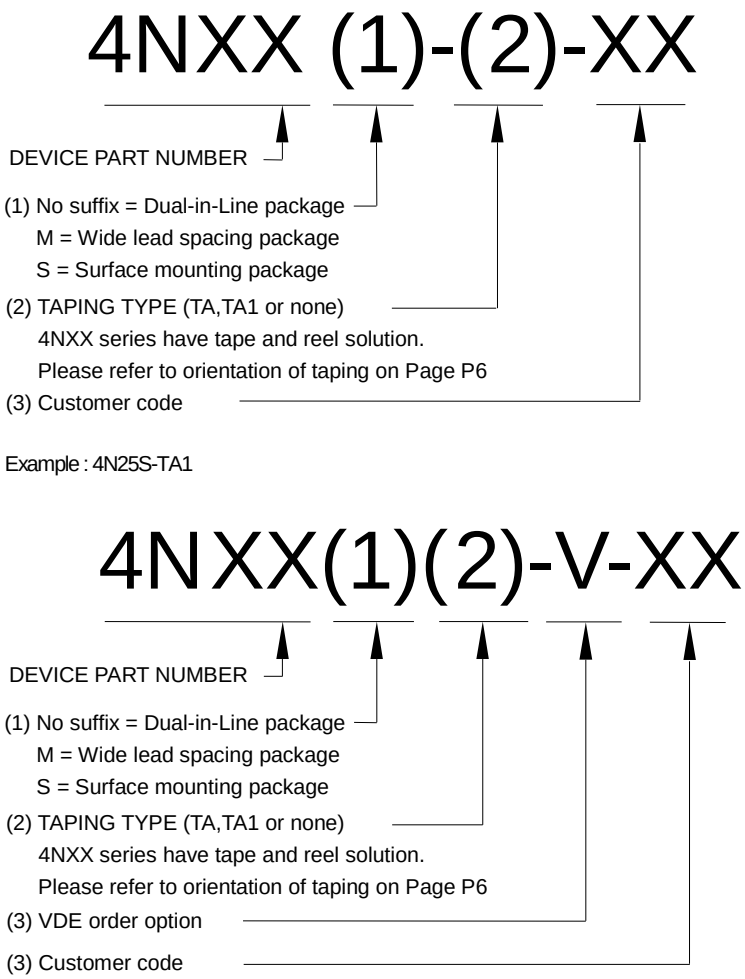
## 7. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)




**Note :**

Dimensions in millimeters.

## 8. NAMING RULE




Example : 4N25S-TA1




Example : 4N25STA1-V-G

## 9. NOTES

- LiteOn is continually improving the quality, reliability, function or design and LiteOn reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any ”specific” application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.
- The contents described herein are subject to change without prior notice.
- Immerging unit’s body in solder paste is not recommended.